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Original

Perception of children and guardians on the use of virtual reality in peripheral intravenous catheter

Percepção da criança e do responsável sobre o uso da realidade virtual na cateterização intravenosa periférica

Percepción de niños y tutores sobre el uso de la realidad virtual en el cateterismo intravenoso periférico

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Abstract

Objective: To find out the perception of children and their guardians regarding the use of virtual reality goggles in the insertion of peripheral intravenous catheter in Pediatric Emergencies. **Methods:** A descriptive, exploratory and qualitative study was carried out between April and September 2022 in the Emergency Department of a Public Children's Hospital in Southern Brazil. Twelve children between the ages of 4 and 12 and their respective guardians made up the sample. Data collection took place in three phases: 1) Invitation to collaborate in the research and interview; 2) Instructional therapeutic toy session with virtual reality goggles; 3) Peripheral intravenous catheter procedure. Data was analyzed using deductive analysis and the DIVA, OSDB and FPS-R scales. **Results:** Participants were predominantly male children aged seven, accompanied by their mothers. All the children had a good chance of success on their first attempt at the procedure according to the DIVA Scale; virtual reality corroborated collaborative behavior according to the OSDB Scale; and only one child felt the worst pain according to the FPS-R Scale. The qualitative data was categorized into: pre, during and post-procedure. **Conclusion:** Virtual reality is positive in reducing negative feelings and attenuates physical, psychological and emotional responses associated with peripheral intravenous catheter.

Descriptors: Virtual Reality; Pain; Catheterization, Peripheral; Child Care; Pediatric Nursing.

Whats is already known on this?
Despite advances in science, the Peripheral Intravenous Catheter still causes fear, stress and pain to children and is a procedure commonly used in the context of Pediatric Emergencies.

What this study adds?
Virtual reality helps to make Peripheral Intravenous Catheter less traumatic for the child and their guardian.

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Resumo

Objetivo: *Conhecer a percepção da criança e do seu responsável quanto ao uso dos óculos de realidade virtual na inserção do cateterismo intravenoso periférico em Emergências Pediátricas.* ***Métodos:*** *Pesquisa descritiva, exploratória e qualitativa, realizada entre abril e setembro de 2022 nas Emergências de Hospital Público Infantil do Sul do Brasil. Doze crianças entre 4 e 12 anos de idade e seus respectivos responsáveis compuseram a amostra. A coleta de dados se desdobrou em três fases: 1) Convite para colaborar na pesquisa e entrevista; 2) Sessão de brinquedo terapêutico instrucional com óculos de realidade virtual; 3) Procedimento de cateterismo intravenoso periférico. A análise dos dados ocorreu pela análise dedutiva e aplicação das Escalas DIVA, OSDB e FPS-R.* ***Resultados:*** *Participaram predominantemente crianças do sexo masculino, com sete anos de idade, acompanhadas pelas mães. Todas as crianças tinham boas chances de sucesso na primeira tentativa do procedimento pela Escala DIVA; a realidade virtual corroborou para comportamento colaborativo segundo Escala OSDB; e apenas uma criança sentiu a pior dor pela Escala FPS-R. Os dados qualitativos foram categorizados em: pré, durante e pós-procedimento.* ***Conclusão:*** *A realidade virtual é positiva na redução de sentimentos negativos e atenua respostas físicas, psicológicas e emocionais associadas ao cateterismo intravenoso periférico.*

Descritores: *Realidade Virtual; Dor; Cateterismo Periférico; Cuidado da Criança; Enfermagem Pediátrica.*

Resumén

Objetivo: *Conocer la percepción de niños y tutores respecto al uso de gafas de realidad virtual al momento de realizar un cateterismo intravenoso periférico en Emergencias Pediátricas.* ***Métodos:*** *Investigación descriptiva, exploratoria y cualitativa, realizada entre abril y septiembre de 2022 en las Salas de Emergencia de un Hospital Público Infantil del Sur de Brasil. La muestra se constituyó por doce niños entre 4 y 12 años y sus respectivos tutores. La recolección de datos se realizó en tres etapas: 1) Invitación a colaborar en la investigación y entrevista; 2) Sesión instructiva de juego terapéutico con gafas de realidad virtual; 3) Procedimiento de cateterismo intravenoso periférico. El análisis de datos se realizó por método deductivo y aplicación de las Escalas DIVA, OSDB y FPS-R.* ***Resultados:*** *Participaron predominantemente niños varones de siete años, acompañados de sus madres. Según la Escala DIVA, todos los niños tuvieron buenas posibilidades de éxito en el primer intento del procedimiento; según la Escala OSDB, la realidad virtual corroboró el comportamiento colaborativo; y sólo un niño sintió el peor dolor según la Escala FPS-R. Los datos cualitativos se clasificaron en: antes, durante y después del procedimiento.* ***Conclusión:*** *La realidad virtual es positiva para reducir los sentimientos negativos y atenuar las respuestas físicas, psicológicas y emocionales asociadas al cateterismo intravenoso periférico.*

Descriptores*: Realidad Virtual; Dolor; Cateterismo Periférico; Cuidado del Niño; Enfermería Pediátrica.*

INTRODUCTION

Despite the evolution in Peripheral Intravenous Catheter (PIVC) practices, it is still permeated by pain, fear, anxiety and stress.[1] In pediatrics, in addition to the stressful factors of catheterization, children also deal with the process of becoming ill, which results in hospitalization in a strange environment, with unfamiliar people,[2] undergoing different painful procedures for diagnostic and/or therapeutic purposes.[3]

In this scenario, it can be seen that the combination of emotional, physical and psychological factors can create "threatening situations" for the child, contributing to the generation of trauma,[4] as well as heightening symptoms such as stress, insecurity and anxiety.[5] Guardians are also affected by these situations, as they need to control their feelings/attitudes in order to help the child during the manifestation of negative reactions such as pain and fear related to PIVC.[2]

In the context of the Pediatric Emergency Department, the insertion of the PIVC is a procedure carried out on a daily basis, with an approximate execution rate of 80%.[6] As a result, there is a need to be attentive to behaviors that aim to mitigate the negative experiences and feelings that this procedure can cause in children[4] and their guardians.[2] Thus, specific preparation for this procedure, involving both the child and their guardian, can reduce the fear and anxiety[5] caused by PIVC.

As far as pediatric pain is concerned, children have a memory for it, and when left untreated or inadequately managed, it has a negative impact on child development. It should be noted that managing pediatric pain is a challenge, since children, depending on their age group/developmental stage, may have difficulty transmitting it accurately.[7]

It is up to the health professional to find ways to correctly measure and treat pediatric pain, as its proper management can contribute to the regression of the clinical condition, as well as to specific care for the child. One resource to be used by professionals is pain scales, designed according to their age.[8]

In order to treat pain, non-pharmacological methods can be used during painful and invasive procedures, with the aim of distracting and minimizing negative feelings in the child[9] and, consequently, in their guardian. Among the options is Virtual Reality (VR),[9] which transmits three-dimensional images to the user and allows them to experience the images more vividly, helping the child to believe they are in another reality. VR makes it possible to mix sensations and emotions from the real and virtual worlds by simulating environments and people.[10]

VR is a technology that can be used with glasses or a helmet, and has proven to be an effective and low-cost resource for pediatric pain management.[9] In the context of PIVC, it has shown positive effects both in pain management and in relieving feelings such as anxiety, fear and stress in both users and guardians.[9]

Although the use of VR goggles is innovative, it is necessary to find out about the perception of children and their guardians regarding the use of this technology during PIVC. The guiding question is therefore: What is the perception of children and their guardians regarding the use of VR goggles in the insertion of PIVC in Pediatric Emergencies? The aim was to find out the perception of children and their guardians regarding the use of VR goggles in the insertion of PIVC in Pediatric Emergencies.

METHODS

This is a descriptive and exploratory study with a qualitative approach, and its report is based on the Consolidated Criteria for Reporting Qualitative Research (COREQ),[11] and was carried out in the General Emergency and COVID sectors, between April and September 2022, in a Public Children's Hospital, located in Southern Brazil.

The sample consisted of children and their guardians treated in pediatric emergencies (general or COVID) who required the use of PIVC. Thus, the following were included: children between 4 and 12 years of age treated in pediatric emergencies (general or COVID); who had Brazilian Portuguese as their main language, due to the high number of foreigners treated at the collection site; and who were physically and cognitively able to answer the questions. In addition, children who had symptoms related to the use of VR, such as nausea, headache and dizziness, who did not answer all the questions or who asked to stop using VR were excluded from the study.

As for guardians, we included those aged 18 or over, who were accompanying a child participating in the study, whose native language was Brazilian Portuguese and who were physically and cognitively able to answer the questions. The guardians who did not answer all the questions in the instrument or had a child under their care excluded from the study were excluded.

Data was collected from the children in three stages: 1) Invitation to collaborate in the research and interview; 2) Preparing the child using the therapeutic instructional toy (Brinquedo Terapêutico Instrucional, BTI) with the use of VR goggles; and 3) Carrying out the PIVC procedure with the use of VR goggles by the child. It should be noted that these stages were conducted using an instrument that covered the three stages of the PIVC, i.e. before, during and after the PIVC insertion procedure.

In the first stage, after screening and medical attention in the pediatric emergency room (general or COVID), the children who needed PIVC were approached by the researcher together with their guardians. The research was presented, indicating its purpose, benefits and limitations, as well as the data collection procedure. Those who agreed to take part in the study (children and their guardians), after checking the eligibility criteria, were taken to an available office to ensure their privacy. An interview was then carried out with the child in this reserved place in the units, including questions about sociodemographic characteristics such as gender, age, education, skin color and the guardian's relationship, as well as open-ended questions that covered knowledge about their state of health, previous experiences with PIVC and VR.

In the second stage, a BTI session was held to explain the procedure to the child and guardian. During the session, the researcher performed the PIVC procedure on a doll that was wearing the VR glasses, in order to demonstrate step-by-step what would be done with the child afterwards. The children were then given the opportunity to reproduce the procedure on the doll, if they were interested. It's worth mentioning that the VR goggles were used during the BTI so that the child could become familiar with them, and they and their guardian were allowed to ask questions about how to perform the procedure using the VR goggles. After the BTI was completed, the child and their guardian were taken to the procedure room for the PIVC to be carried out by the Unit's nursing technicians.

In the third stage, after the child had been placed on the stretcher in the Unit's procedure room, the VR goggles were positioned, the 3D Warrior VR Glass JS model, with video transmission of the seabed, used in another study which classified it as tranquilizing for children in the same age group as this study.[12] During the procedure, the researcher took note of its characteristics and applied the Difficult Intravenous Access Score (DIVA).[13-14] The purpose of the DIVA Scale is to measure the difficulty level of peripheral intravenous access in children, as verified by the predictive variables visibility, palpability, age, prematurity and skin tone.[13-14] It should be noted that this scale has a score ranging from 0 to 11, and that

a score of four or more indicates that there is a 50% greater chance of failure on the first attempt at PIVC.(14) It should be noted that PIVC is considered successful when venous access is obtained on the first catheterization attempt, with the presence of blood reflux along the entire length of the catheter, as well as infusion of 1 to 10 ml of 0.9% Sodium Chloride without interfering with inspection or palpation at the catheterization site or signs or symptoms that indicate complications such as infiltration and hematoma formation.[15]

The researcher then checked the behavioral variables of the Observational Scale of Behavioral Distress (OSBD)[16]: search for information, verbal resistance, verbalization of fear, verbalization of pain, emotional support, crying, screaming, grumbling, rigidity, refusal behavior, restraint, struggling and nervous behavior. Afterwards, at the end of the procedure, the child was asked about their pain using the Faces Pain Scale - Revised (FPS-R),[17] thus analyzing the pain associated with PIVC, and questions were asked about the experience of using VR goggles during the procedure and the impact of VR on the feelings experienced during and associated with PIVC.

Despite taking part in the whole process, data collection with the guardian took place at two different times. In a private room, the guardian was asked about their sociodemographic aspects such as gender, age and education and about the child's previous experience with PIVC, including their perception of the child's current feelings and their expectations with the use of VR. The second moment took place after the end of the procedure with the child, when he was asked about his opinion on the use of VR during PIVC.

It should be noted that data collection ended when data saturation was reached. The answers to the open questions were recorded and transcribed in full. It should be noted that the participants were identified by the letter C for the children with their respective numbers according to the order of participation in the study and their age, and the letter G for the guardians, followed by the number corresponding to the children.

The data was analyzed using deductive analysis.[18] The categories were previously defined as pre, during and post procedure. Three stages were followed in the process: pre-analysis, exploration of the material, treatment of the results and interpretation,[18] involving critical reflection for interpretation and comparison with the findings of the literature. Data analysis was enriched by observing the procedure, together with the application of the DIVA and FPS-R Scales and the behavioral variables of the OSDB Scale, providing a more in-depth contextualization of the data.

The research followed the ethical precepts of Resolution 466/2012 of the National Health Council of the Ministry of Health. It was appraised and approved by the Research Ethics Committees of the Federal University of Santa Catarina and the Joana de Gusmão Children's Hospital, under opinion numbers 5.367.957/2022 and 5.482.849/2022, respectively.

RESULTS

Twelve children and their respective guardians took part in the study, making a total of 24 participants. Most of the children were male (n = 8; 66.8%), aged seven (n = 4; 33.2%), and most of the guardians were mothers (n = 9; 74.8%), followed by fathers (n = 2; 16.8%) and grandmothers (n = 1; 8.4%).

The clinical conditions manifested at the time of hospital admission were: headache, lower limb fracture, urinary infection, respiratory symptom, suspected appendicitis and cancer treatment.

It's worth noting that, according to the children and their guardians, six (50%) of them had already been to the PIVC. And using the DIVA Scale, which checks the child's difficulty level with PIVC, four (33.2%) children scored 3, one (8.4%) scored 1 and seven (58.4%) scored 0. In relation to vein visibility, nine (74.8%) children had visible veins, while 11 (91.6%) had palpable veins. In terms of age, all the children (n = 12; 100%) were over 36 months old, and in terms of prematurity, all of them (n = 12; 100%) were born at term. In relation to skin tone, seven (58.4%) children were light-skinned (white) and five (41.6%) were dark-skinned (black or brown).

Pre-procedure

In relation to the PIVC, the children said they didn't know why they were being subjected to the procedure, but expressed negative feelings about the situation, including nervousness, fear and sadness. Only two (16.8%) children were able to give an opinion on the possibility of making PIVC less uncomfortable or painful, mentioning the possibility of using “medicine” or “medication”.

After the researcher explained the possibility of using VR glasses and asked if they had ever used them, three (25%) children said they had already used them recreationally and indicated positive opinions about VR glasses:

> At Beto Carreiro. It was nice. (C1, 7 years old)
>
> Once, it was nice. (C4, 9 years old)
>
> From my friend. (C8, 9 years old)

When the guardians were asked about the PIVC procedures carried out on the children previously, those who had experienced it said that the children had negative feelings:

> She's very panicky, very panicky [...]. Needle trauma, trauma. (G1)
>
> She gets very nervous. She cries a lot, struggles, then the nurses can't find her vein and have to pierce it several times. (G11)
>
> He gets very anxious, cries and screams. (G8)

After explaining to the guardians about the use of VR glasses during the procedure, their expectations were questioned and it was found that they were excited about this possibility, as they believed that the children's negative feelings could be alleviated, as can be seen:

> It's going to be a new experience for us [...]. I still don't know what's going to happen. But if it's like those virtual things they like, it attracts attention. I think it will attract attention and she'll feel lighter, calmer so she can take the exam. (G1)
>
> I think it will be nice. (G2)
>
> It'll be great, anything to keep him out of pain. If it works, you'll have to wear glasses every day. (G8)
>
> I hope it's nice, right son? Keep him calm and quiet. (G3)
>
> I think it's going to be really nice, I want it for my other daughter too. (G9)

During the procedure

During the procedure, the children's behavior varied (Chart 1), and it is important to note that all of them (n = 12; 100%) agreed that they did not verbalize pain or scream during the procedure. In addition, the majority, i.e. 11 (91.6%) of them, did not show any verbal resistance to the procedure, nor did they struggle during it, and eight (66.8%) did not need to be restrained. However, 11 (91.6%) needed emotional support from their guardians, words of comfort, such as "everything will be fine" or "it'll only take a minute".

Complications occurred in six (50%) procedures, with three (25%) requiring two attempts and another three (25%) requiring three catheterization attempts.

During the procedure, only one child (8.4%) needed to remove their VR goggles during the second catheterization attempt, because they were keeping their eyes closed instead of watching the video broadcast. It's important to note that, according to the guardian (G1), this child (C1) experienced fear because he had already undergone the procedure on previous occasions. It's worth noting that although his DIVA Scale score was zero, it took him three attempts to perform the catheterization.

Chart 1. The child's behavior during PIVC. Florianópolis, SC, Brazil, 2022.

The child's behavior during PIVC	Present n (%)	Absent n (%)
Search for information during the PIVC	2 (16.8)	10 (83.2)
Presenting verbal resistance to the procedure	1 (8.4)	11 (91.6)
Verbalizing fear	5 (41.6)	7 (58.4)
Verbalizing pain	0 (0)	12 (100)
Need emotional support from those in charge (words of comfort)	11 (91.6)	1 (8.4)
Crying during the procedure	4 (33.2)	8 (66.8)
Shouting during the procedure	0 (0)	12 (100)
Grumbling during the procedure	2 (16.8)	10 (83.2)
Stiff limbs during the procedure	5 (41.6)	7 (58.4)
Deny the procedure with the head or pull the body away	2 (16.8)	10 (83.2)
Being restrained by carers and professionals during the procedure	4 (33.2)	8 (66.8)
Struggling during the procedure	1 (8.4)	11 (91.6)
Being nervous during the procedure	3 (25.2)	9 (74.8)

Source: Research data, 2022.

In relation to the pain experienced by the child during the PIVC procedure, one (8.4%) child described it as the most intense pain they had ever felt (score 10), three (25%) as uncomfortable (score 4), three (25%) as mild pain (score 2) and five (41.6%) as painless (score 0), according to the FPS-R Scale.[17]

The children (n = 12; 100%) interviewed said they had enjoyed wearing the VR glasses:

> It was great. I really enjoyed it. Even I wanted one. (C3, 7 years old)
>
> Very cool. (C4, 9 years old)
>
> I really liked it. (C6, 7 years old)

Post-procedure

The children expressed positive feelings about wearing VR goggles during the catheterization procedure:

> I felt calm. (C3, 7 years old)
>
> I felt good. Frightened at first. I was less afraid because of the glasses. (C4, 9 years old)
>
> With less pain. (C7, 6 years old)
>
> I liked the little fish. (C10, 7 years old)

The children (n = 12; 100%) stated that the use of VR goggles helped to reduce pain, fear and anxiety related to the PIVC procedure. In addition, ten (83.2%) children gave VR a score of 10 as a means of distraction during the PIVC procedure, while another two (16.8%) children gave it a score of 9.

> I liked it a lot. (C3, 7 years old)
>
> Less anxiety and fear. (C5, 10 years old)

As for the caregivers, their assessments of the use of VR during PIVC as a form of distraction and to reduce pain and anxiety related to the procedure were all positive:

> Very good. It keeps them very calm. Very efficient. (G4)
>
> [...] I thought he was going to feel more pain and I thought he was quite calm. (G5)

> It was very good, he liked it, he was less anxious about seeing the little fish. (G6)
>
> Wow, that was great. She was very calm, she didn't even seem afraid [...]. Of course, this eyewear is sensational. She kept counting the turtles and when she saw it was over. (G11)
>
> It's good to distract them a bit. It takes the focus off the needle. (G2)
>
> I thought it was great, we want to do it again tomorrow. (G8)
>
> It was really good, less stress for the children, they're calm, and so are the staff. (G10)

In the case of C1, who removed her glasses during the PIVC, the guardian reports:

> Well, I thought it would be good, but you have to admit that [child's name] is already traumatized. At first she accepted, she was calm, but in reality she was terrified because the doctor couldn't find her vein and ended up puncturing it several times. Then she got nervous and closed her eyes, because she was anxious [...]. I think it's for pain control, if the child has a good vein and it stays. But I think that because [child's name] has already been traumatized since she was a child, since she was a baby in hospital, she's already been traumatized because of this. So it's not because they didn't find her access, right, I think her access was more difficult, they had to drill three, four times. (G1)

DISCUSSION

Most of the children in this study were in the school age group, predominantly seven-year-olds, fair-skinned and male. This trend coincides with other studies which identify a prevalence of male pediatric patients as the most frequent group to seek urgent and emergency services.[19-20] The importance of these characteristics stands out, since age, skin color and gender are significant indicators of heterogeneity in the perceptions of physical and emotional stimuli experienced.[21]

The results show that mothers were the main guardians for the children, in line with another study which points out that in pediatrics, mothers are the main guardians for children, since they are the family's main caregivers.[22] Fathers came second, as they are considered the secondary caregivers and their role is to take care of the family financially.[22]

Another study, which also had mothers as the main guardians, found that feelings such as pain, nervousness, fear and pity were experienced when it came to PIVC. In addition, by having to help restrain or calm the child, the guardian needs to repress their feelings during the procedure.[2] However, this study made it possible for guardians to participate in a moment that is considered stressful and painful for the child in a playful way, with the help of the distraction promoted by VR, instead of the routine that is associated with negative aspects.

Another aspect is that PIVC is performed routinely in the Pediatric Emergency Department, especially in cases where there is a need for fluid replacement and medication administration, including antibiotic treatment.[6] In this way, the demand for PIVC in this study was similar to that found in the aforementioned study,[6] as the 12 (100%) children presented clinical aspects that culminated in the use of PIVC for fluid replacement and medication for pain, nausea and antibiotic therapy.

Half of the children taking part in this study had previous experience with PIVC. However, the children were unaware of the step-by-step procedure and the reason for it. In addition, the children and their guardians spoke of traumatic experiences associated with PIVC because there had been no preparation and/or specific care for the procedure in previous situations. Therefore, the use of techniques and technologies to prepare children for hospital procedures enabled them to recognize the importance of the interventions, as well as making the process easier and more comfortable.[23] The VR used in this study reassured the child and their guardian and, consequently, made the experience less traumatic for both.

It should be noted that in addition to considering the child's previous experience, it is important to assess their venous network using the DIVA Scale.[14] In this particular study, no child had a difficult PIVC score, but only half of the children were successful during the first attempt at the procedure. This result may be correlated with the child's use of VR, which had fewer physical reactions and consequently made it easier to perform PIVC, including for the nursing technicians.

The children and guardians who took part in this study said that VR helped reduce the fear, pain and anxiety associated with PIVC. In addition, the child's lack of preparation, the lack of distraction and

pain management methods in the face of PIVC provokes negative feelings such as fear, anxiety and stress, culminating in the child responding physically by crying, screaming and being aggressive, as they are unable to control their emotions, making catheterization even more challenging.[2,4]

In this study, when reporting on previous PIVC experiences, most of the children associated negative feelings with the procedure. After experiencing PIVC with the use of VR, all the children pointed to the device as beneficial in reducing the pain, fear and anxiety associated with the procedure. Based on the reports of this research and other studies, we can see the importance of nursing professionals seeking to implement VR technology in their care, especially during PIVC in pediatric patients. It is also important for the health institution to provide resources and adequate training for its staff in order to promote specific care for children and their guardians.

The children's behavior during the PIVC varied, but it is noteworthy that only four (33.2%) children cried, two (16.8%) refused to perform the procedure, saying no with their heads or pulling their bodies away, and none screamed. This scenario may be an indication that these common behaviors when performing PIVC can be mitigated through the use of VR.

It should also be emphasized that, in addition to the child, this better coping with PIVC provided by VR is reflected in the emotions transmitted to the guardian. A study reports that, conventionally, they experience nervousness, pity and fear in the face of the procedure, as mentioned above, when distraction and pain management methods are not used.[2,4] As a result, guardians find it difficult to communicate with the child.[2,4] Thus, in addition to benefiting the child, VR brings benefits to the relationship between the professional, guardian and child, as well as to the guardians' coping.[21]

In this study, all the guardians had high expectations of the use of VR to distract the children and at the end of the procedure, when asked, all 12 (100%) identified VR as a positive method for controlling and reducing fear, pain and anxiety, as well as calming the feelings of both the child and themselves.

During the interviews, there was a lack of knowledge on the part of children, guardians and health professionals about strategies to reduce negative feelings when coping with PIVC. As far as health professionals are concerned, it should be noted that due to the high demand in the emergency room, it is not always possible to adopt distraction strategies.

Thus, VR as a non-pharmacological method is still little known and little used, but there is scientific evidence of its effectiveness for sensory distraction, affecting senses such as sight, hearing and touch to control pain, fear, anxiety and stress.[21] At the end of the procedure, the children's knowledge through the demonstration of PIVC in the BTI, corroborated the use of VR to make them feel calmer and more prepared for the procedure. It is worth noting that even though six (50%) children had already undergone the procedure before, they all reported feeling more comfortable and less anxious with the use of VR during the procedure.

The children in this study, as reported, scored VR positively as a method of distraction from their feelings of fear and anxiety, highlighting that it even helped to reduce their pain. VR is a promising method for controlling fear, stress and anxiety because it replaces the pediatric patient's focus during painful procedures, allowing the user to experience sensorially and physically through three-dimensional images, taking them away from their real senses.[21] The results of this study are in line with other studies, which identify forms of distraction as positive during painful procedures in pediatrics.[9,21,24-26]

There are several theories that corroborate the idea of the distraction produced by VR as a method of controlling pain and anxiety in patients. A North American study suggests that the pain stimulus is not sent directly to the brain, but is transmitted peripherally along the way where other stimuli share the path such as attention, emotion and memory that sensory perception.[27] In another explanation, it is believed that if the patient's attention is elsewhere, the sense of pain and anxiety will be less due to distraction.[28] Thus, VR adapted to the condition and procedure to be performed on the pediatric patient stimulates cognitive and emotional centers of the Central Nervous System that intervene to reduce painful physical and negative emotional sensations.[21]

The emotional support of both the child and guardian for the nursing professional who is going to carry out the PIVC procedure is fundamental, in order to reassure and support. In this way, it is possible to provide humanized, quality care in an individualized and comprehensive manner.[21] The use of VR was an important contributor to supporting the children. Both they and their guardians said it was beneficial to use it as a way of distracting from PIVC, which is a painful and often traumatizing procedure.

Restraint of the child by the guardian is indicated in the case of small or very agitated children, in order to avoid failures in the procedure due to the child's physical reaction and for the safety of both the

child and/or guardian and the professionals.[29] In this way, the guardian can hold the child on their lap without using excessive force, wrap them in cloths or comfort them on the stretcher in a prone or lateral position.[29] Restraint can be a negative experience for both the guardian and the child, who may interpret it as a form of punishment, so it should be avoided whenever possible.[29] With the use of VR, only four (33.2%) children needed to be physically restrained by carers and nursing technicians.

The limitation of the study was that there was no single location for the interview and the BTI session, which may have distracted the child and their guardian at some point. The study contributes to the discussion about the need to adopt technologies that help with the problem, and VR has shown important benefits, as well as being easy to implement and use in different environments and under different procedures.

CONCLUSION

It was found that the children and their guardians considered the use of VR to be a positive method for reducing the negative feelings associated with the PIVC. It was also noted that their physical, psychological and emotional responses to the procedure were attenuated. It is recommended that future studies be carried out looking at hospital units other than the emergency department and at other interstate and international situations.

CONTRIBUITIONS

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